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(54) TRANSPORT AND LOADING DEVICE FOR THE THERMAL REGENERATION OF FOODSTUFFS

(71) We, BURGER EISENWERKE AKTIENGESELLSCHAFT, a German Company, of 6348 Herborn, Postfach 1120, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a transport and loading device for the thermal regeneration of foodstuffs in a heat treatment apparatus.

In present day mass catering arrangements, it is gradually becoming general practice to prepare the meals centrally and independently of the times at which they are eaten, and to supply them as prepared and cooled "units" to the places at which they are issued, at which places they are thermally regenerated a short time before being issued. The problems involved with this procedure do not relate to the preparation and preservation of the food but to rational transportation and to a suitable method of making the food ready for consumption before the issue, portion by portion, of a large number of portions of food.

The food is cooked, cooled and divided up into portions in the cooled condition in a central kitchen during normal working hours and independently of any kind of peak-period work, and stored in the refrigerator at temperatures ranging between 0° and +4°C, for up to 4 days. At the time at which the food is to be eaten, it is transported to the final consumption station, heated with a thermal treatment apparatus to the eating temperature of between 60 and 65°C, and served.

For the smooth operation of this procedure, it is necessary to provide suitable crockery, transport devices and heat treatment apparatus.

It is known to arrange a large amount of crockery on a frame, in tiers one above

the other, so as in this way to achieve improved use of the available space and more rapid loading and unloading of the heat treatment apparatus. However, this method still has some disadvantages. The displacement of the frame must be effected with a certain degree of care, in order that the individual crockery articles may not be displaced excessively on their bases so that liquids, such as sauces and soups, are spilt out of the crockery. Similarly, the transport problem involved has not yet been satisfactorily solved.

It is the object of the invention to improve the transportation of the foodstuff units, after precooling, to the heat treatment apparatus, and also to improve the loading and unloading of the units into or out of the heat treatment apparatus and the distribution of the units to the individual stations at which they are to be served to the consumer.

According to the invention, this result is achieved by transport and loading apparatus for use with apparatus for the heat treatment of foodstuffs, comprising a plurality of box-like frames adjusted to be stacked one above the other, a pallet which is provided with rollers and is adapted to carry the frames, a transport trolley on which the pallet may be locked, and a plurality of containers adapted to be stacked in spaced relationship one above the other in the frames, containers stacked in a frame being held under pressure by means of at least one spring attached to a cover face of the frame.

Due to the spacing provided between the individual containers, uniform heating of the food due to heat convection of the circulation of warm air is achieved. In a simple manner, the necessary spacing is provided, according to the invention by an arrangement whereby the cover or lid of the container has on its upper side at least three (preferably four) spacer projections (the plate bottom having

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recesses for the said projections) of sufficient height to ensure that when the food crockery articles are stacked one above the other an intermediate space for the flow of hot air remains. A further feature of the invention is to be seen to reside in the fact that the cover or lid, which is made from slightly flexible material forms at its edge, as seen in cross-section, a single step and extends in roof-like manner beyond the edge of the dish. Due to the vertical pressure exerted on the stack of the containers by means of the spring disposed on the cover face of the frame, the covers or lids bear in fluid-tight manner on the rims of the plates and in this way prevent liquids spilling over.

In order to be able to stack a plurality of box-shaped frames reliably one above the other, there are attached to the underside thereof legs which snap into the cover face of the particular frame disposed underneath.

The cover face and the lateral wall of each frame are pivotably joined by means of an interposed hinge and a hinge is disposed at the end of the cover face located opposite the lateral portion. The transport trolley has a cover plate which, according to one aspect of the invention, has roller tracks for the pallet, which is provided with rollers.

The transport trolley is pushed to the heat treatment apparatus and the frames, with the food containers, may be displaced on the travelling pallet into the heat treatment apparatus.

The height of the transport trolley is such that a projection on the cover plate extends, at the rear side of the transport trolley, into the heat treatment apparatus and bears in overlapping fashion on the floor of the apparatus. In this way, a troublesome gap between the apparatus and the transport trolley is avoided and the pallet may be moved thereon, without danger, for regenerating the food.

For transport, the pallet is, with the frames stacked thereon, adapted to be locked on the transport trolley by means of a latch.

If after regeneration, a long transport distance to the final consumer is necessary, then the transport trolley may be constructed as a closed compartment and act as a warming cabinet, being provided with the necessary heating apparatus.

By means of the device according to the invention, the amount of work and time required for the transport of precooked food-stuff portion and for the loading and unloading heat treatment apparatus for the regeneration of the foodstuffs is reduced to a minimum.

After the portioning of the precooked food into the container, the latter are stacked in the frames, pushed in the transport trolley to the refrigerator and are stored

therein on the pallet for cooling up to the time of regeneration.

For transport to the heat treatment apparatus, the displacement pallet is once again locked on the transport trolley and in this way is conveyed to the apparatus or, if cooking is being done in a central kitchen, to a delivery vehicle.

A further advantage of the device according to the invention resides in the distribution of food after regeneration.

If a number of consumers, for example as in hospitals or sanatoria, are at various points or in various rooms, it is not necessary to take the entire unit everywhere. It is merely necessary to remove from the unit a frame containing the necessary containers and to convey it to the particular room.

It is also advantageous that, due to the play-free stacking of the frames and due to the vertical exertion of pressure on the containers, there are no irritating noises during transport and the individual containers also cannot be displaced in undesirable manner.

In the manner described above, the space available in the refrigerator and heat treatment apparatus is utilised to a greater degree.

The transport and loading device according to the invention may be used in a similar manner for the thawing and preparation of deep-frozen foods.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be directed, by way of example to the accompanying drawings, in which:

Figure 1 is a lateral elevation of the device.

Figure 2 is a front elevation of the device, and

Figure 3 is a detail to an enlarged scale of that part of Figure 1 marked "A".

The regeneration of food is effected in a heat treatment apparatus 1 by means of a fan 2 which circulates air heated by element 3.

The device consists of a transport trolley 4, a displaceable pallet 5, box like frames 6 and containers 7 comprising dinner plates 115 and covers or lids 9.

The device according to this embodiment consists of twelve frames each of which holds eight containers.

An eating plate 8 consists of a thermally insulating material which stores heat and is of circular shape, although they could be rectangular or hexagonal, for example, a peripherally extending horizontal or outwardly inclined rim 10 and also a raised portion 11 extending about the outer base and surrounding the inner cavity. The geometrical shape of a cover or lid 9 corresponds to the shape of the plate 8. It is made from a heat-resistant material, for ex-

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FIG.2

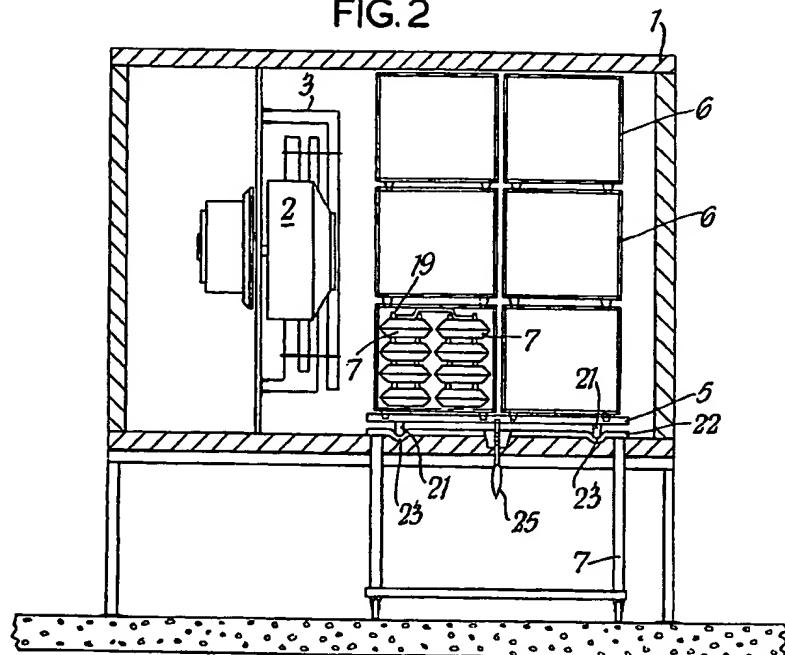
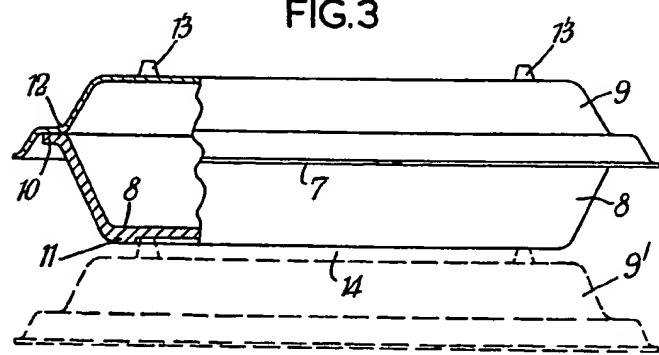


FIG.3



- ample chromium nickel steel. Its rim is stepped and bears with its horizontal portion 12 on the rim 10 of the plate 8.
- Arranged above the surface of the cover 5 9 are three or more protuberances 13 the height of which is such that there remains between the surface of the cover 19 and the bottom of another plate 8 an intermediate space 14 permitting throughflow of the hot 10 air. In order that, on being stacked, the crockery may be correctly positioned and may not be able to slide off during transport, the protuberances are so arranged that each one of them snaps into the corners formed 15 by the raised portion 11. The number of protuberances may correspond to the number of corners of the plate 8. In the case of hexagonal and round plates, three spacer protuberances will suffice.
- 20 Stacked one above the other in frame 6, which is box-like are two rows each comprising four containers. To facilitate insertion and removal of the containers, the cover face 15 of the frame 6 is, jointly with 25 a lateral face 16, adapted to be pivoted via the hinges 17 and 18. A leaf spring 19 attached to the cover face 15 at its centre exerts, in the closed position of the frame 6, a vertical pressure on the two rows of containers, one end of the spring bearing on 30 each container.
- Each frame 6 consists of a galvanised wire frame and each has four wire legs 20 which are centred in the cover face of the particular frame disposed underneath, thereby making secure stacking possible. The wire legs of the undermost frames are centred in bores formed in the pallet 5.
- The pallet 5 is provided with rollers 21. 35 The cover plate 22 of transport trolley 4 has beads 23 used for stiffening and to act as roller tracks and which project, with a projection 24 at the rear face of the transport trolley, into the heat treatment apparatus.
- 40 The height of the transport trolley 4 is such that the projection 24 overlaps the floor of the heat treatment apparatus.
- For transport, the pallet 5 is adapted to be locked on the transport trolley 4 with the 45 aid of latching means 25.
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- WHAT WE CLAIM IS:—**
1. Transport and loading apparatus for use with apparatus for the heat treatment of foodstuffs, comprising a plurality of box-like frames adapted to be stacked one above the other, a pallet which is provided with rollers and is adapted to carry the frames, a transport trolley on which the pallet may be locked, and a plurality of containers adapted 55 to be stacked in spaced relationship one above the other in the frames, containers stacked in a frame being held under pressure by means of at least one spring attached to a cover face of the frame.
 2. Transport and loading apparatus as claimed in claim 1, wherein each container consists of an eating plate and a cover or lid formed with a rim, the rim of the cover forming, as seen in cross-section, a step and extending in roof-like manner beyond the rim of the plate, and the cover having on its upper side at least three spacer protuberances. 65
 3. Transport and loading apparatus as claimed in claim 2, wherein the bottom of the eating plate is formed with recesses of the protuberances and with a peripherally extending raised portion. 70
 4. Transport and loading apparatus as claimed in claim 2 or 3, wherein the cover is made from a flexible material. 75
 5. Transport and loading apparatus as claimed in any preceding claim, wherein the box-like frames consist of a wire frame and a cover face hinged thereto, and have, for stacking purposes, wire legs adapted to co-operate with the cover face of a frame disposed underneath in each particular case. 80
 6. Transport and loading apparatus as claimed in claim 5, wherein the cover face and a lateral face of each frame are adapted to be hinged jointly by means of a hinge disposed between the cover face and the lateral portion and by means of a hinge disposed at the end of the cover face located opposite the lateral portion. 85
 7. Transport and loading apparatus as claimed in any preceding claim, wherein the transport trolley has a coverplate having reinforcing beads designed as roller tracks 100 for the rollers of the displaceable pallet.
 8. Transport and loading apparatus as claimed in any preceding claim, wherein the height of the transport trolley is such that a projection provided on the cover plate of 105 the transport trolley at the rear face thereof extends into the heat treatment apparatus and bears on the apparatus bottom, overlapping the latter.
 9. Transport and loading apparatus as 110 claimed in any preceding claim, wherein a latching means is provided for locking the displaceable pallet.
 10. Transport and loading apparatus as 115 claimed in any preceding claim, wherein the transport trolley is built as a closed compartment and serves as a warming cabinet.
 11. Transport and loading apparatus for use with apparatus for the heat treatment of foodstuffs, substantially as hereinbefore 120 described, with reference to the accompanying drawings.

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Sheet 1

FIG. I

